Sessions 3 and 4

More Practice with Multiples

Materials

- Books of 100 charts
- Student Sheet 5 (1 per student)
- Student Sheet 6 (1 per student, homework)
- Calculators (1 per student)
- *Each Orange Had 8 Slices* by Paul Giganti, Jr., and Donald Crews (optional)
- Colored pencils, markers, or crayons (optional)
- Interlocking cubes (50 per student)

What Happens

Students finish highlighting their books of 100 charts and continue looking at patterns in them. In Choice Time, they work on activities that help them become more familiar with multiples. Their work focuses on:

- recognizing multiples of the same number
- writing about patterns in the 100 charts
- becoming familiar with multiples

Ten-Minute Math: Counting Around the Class During the next two days, continue to do this activity (see p. 91 for full instructions) in short sessions outside the math hour. Count around the class by 3's and then by 6's, with students reading from their 3's charts for both. (They will read only every other number for the 6's.)

Some days, you might have students use a calculator for this activity. If necessary, remind them to use the equals (=) key to skip count, or review the procedure that was presented in the last session. You might use one calculator and pass it around the room, while each student presses the equals key once in turn and reads the resulting number aloud. As a challenge, encourage students to try to say their number before pressing the equals key.

Activity

Choice Time: Exploring Multiples and Patterns

Four Choices During this session and the next, students may choose from three or four activities that are going on simultaneously in the classroom. These activities are designed to give students more experiences with the 100 chart, to help them develop knowledge of the multiples, and to apply this knowledge by solving problems. Encourage students to do each activity at least once.

How to Set Up the Choices Students will need to have the following available for the activities:

Choice 1: Skip Counting with a Partner—their books of 100 charts

Choice 2: Making Towers—their books of 100 charts, cubes, calculators for each student, paper and pencil

Choice 3: Patterns Across the Charts—copies of Student Sheet 5 for each student, their books of 100 charts, pencil

Choice 4: Solving Story Problems (optional)—the book *Each Orange Had 8 Slices*; paper and pencil; colored pencils, markers, or crayons

You may want to list the choices on the board or have students keep track of their work on their own choice lists. Students could write down the name of each activity they do, the charts (the number) they are working on, and the name of their partner (where applicable).

Briefly introduce the four activities. Choice 2 should be introduced with a whole-class demonstration; see the description for specifics.

Choice 1: Skip Counting with a Partner

Partners choose a set of multiples they want to practice from their book of 100 charts. One partner looks at the highlighted chart while the other skip counts without looking at the chart. The purpose of this activity is for both students to become more familiar with skip counting and with recognizing multiples. Partners take turns holding the chart and helping each other.

It is important that students choose their own partners to make this a comfortable and supportive activity. Emphasize that this is not a competition, and that partners are working together so that they both learn.

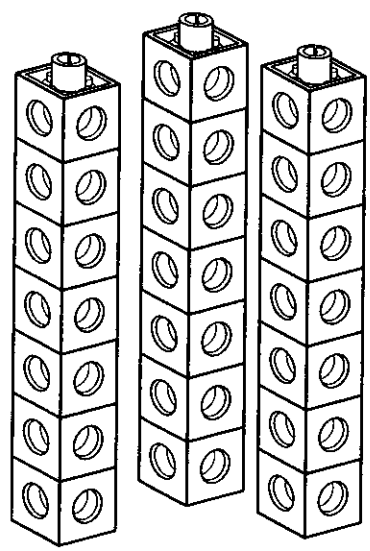
Students can try the following variations as they gain confidence:

- Instead of starting from the number itself (3, 6, 9...), they start from any multiple of the number smaller than 100. For example, on the 3's chart, they might start with 39, and say "39, 42, 45, ..."
- Start just below 100 and count on beyond 100 (for example, 99, 102, 105 ...)
- Count backwards (for example, 63, 60, 57).

Choice 2: Making Towers

With a partner, students start by picking a chart from their book of 100 charts. If they pick the 3's chart, they will make towers of 3 interlocking cubes. If they pick the 7's chart, they will make towers of 7 cubes.

Students then pick a highlighted number on the chosen chart. For example, they might randomly touch a place on the chart with their eyes closed and work with the nearest highlighted number. The challenge is to find out how many towers they need to make exactly that (highlighted) number of cubes, following this procedure:



1. Predict how many towers are needed.
2. Build and count the towers of cubes.
3. Check on a calculator.
4. Write the multiplication sentence.

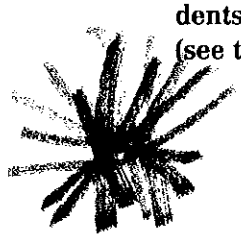
To introduce the activity, demonstrate this procedure once. For example:

1. Point to 18 on the 3's chart.
   I think I'll need to make 6 towers to use 18 cubes.
2. Make 6 towers of 3, and then count the cubes (counting by 3's).
   In 6 towers, I have 3, 6, 9, 12, 15, 18 cubes.
3. Check your counting on a calculator, skip counting by 3's.
4. Write the sentence $3 \times 6 = 18$, or $6 \times 3 = 18$, or 6 towers of 3 = 18.

Also write it vertical

3 6
x6 x3
18 18

Some teachers have suggested that to provide vocabulary practice, students also label the *factors* and the *multiple* in the multiplication sentence (see the **Teacher Note**, Introducing Mathematical Vocabulary, p. 32).



$6 \times 3 = 18$

factor factor multiple

Students can try several highlighted numbers on the same 100 chart. For example, how many 3's (towers of 3) are in 24? 51? 63? Remind students to record their number sentences.

Note: Most of the arithmetic the students have been doing has been multiplication. This activity provides a chance to practice division. Don't insist, however, that students use a division method to make their predictions. Skip counting up to the total is a fine way for students to do division.

Choice 3: Patterns Across the Charts

Each student works with a copy of Student Sheet 5, Patterns Across the Charts. Students use their highlighted 100 charts to answer the questions on this sheet about number patterns in the various charts. They record their answers on the sheet after each question. Students can work in pairs or alone. This is a chance for students to complete their charts and fill in skip counting circles if they haven't done so, and to add more patterns they find to the back of their charts.

❖ **Tip for the Linguistically Diverse Classroom** For Student Sheet 5, pair students who are proficient in English with those who are not yet reading and writing in English. Encourage the use of pointing and head gestures to aid in understanding the questions as they look at the 100 charts together.

Note: All students should complete Student Sheet 5 before the class discussion about patterns across the charts in Session 5 or 6. Therefore, those who do not finish this activity during class time should complete the sheet as homework.

Choice 4: Solving Story Problems

If you did the Session 4 excursion in Investigation 1 and have the book *Each Orange Had 8 Slices*, students can choose to do additional problems now. If you have identified certain problems for students to choose from, mark them with stick-on notes or bookmarks.

For each problem, students write the important information on their paper. Then they explain their solution with writing and pictures, illustrating the problem and writing a multiplication sentence that describes it, as they did with their own problems in the previous investigation.

Teacher Checkpoint

Using the Skip Counting Circles

While students are working on the Choice Time activities in Sessions 3 and 4, walk around and observe them. Check that they can use the skip counting circles at the bottom of the 100 chart to multiply and to divide. For example, if a student is using the 6's chart, ask:

How can you find the answer to 4×6 in these circles?
How can you use these numbers to find out how many 6's are in 42?

Students should be able to count to the fourth circle to find 4×6. They should also be able to divide by counting how many circles there are up to and including the one with 42.

Sessions 3 and 4 Follow-Up

Homework

Silly Story Problems After Session 3, send home Student Sheet 6, Silly Story Problems. For homework, students solve the problems, explain their strategy, and doublecheck by using a 100 chart. Be sure to send home the 100 chart booklets for doing the doublecheck. Remind students to bring back their work and 100 chart booklets the next day.

Patterns Across the Charts After Session 4, students who have not done Choice 3: Patterns Across the Charts should complete Student Sheet 5 at home. They may also use their 100 chart booklets to skip count with someone at home. Remind students to bring back their work and 100 chart booklets the next day.

Teacher Note

Introducing Mathematical Vocabulary

In this unit, several important mathematical words come up naturally in discussing the activities. Introduce these words by beginning to use them yourself. Explain what you mean by them, but don't insist that students use them.

Factor When using the books of 100 charts and writing multiplication number sentences, ways of referring to the numbers that "work" in these activities can be wordy or cumbersome. As you talk about multiples in different contexts, you can gradually introduce the word *factor*. As long as the introduction of a mathematical word is preceded by activities that make its definition clear, students enjoy knowing an "adult" word to refer to a concept they have learned.

Multiple You may want to hold off on this word until *factor* is well established in the students' vocabulary, but it can be naturally introduced in Investigation 2, when students are highlighting multiples on the 100 charts.

Even and Odd These words will come up in the students' descriptions of patterns on the 100 charts. Don't assume that students know exactly what they mean by these words. Some children believe that an even number has only even factors. They might say, "No, 3 isn't a factor of 24 because 3 isn't even."

Row and Column In talking about their work with the 100 charts, students often confuse the words *row* and *column*, describing a pattern as going "down the row" rather than "down the column." This is a good opportunity to talk about the difference, since using *row* for both (as students often do) makes communication more difficult. However, do not insist that students use these words in the conventional way as long as they can explain or demonstrate what they mean. Remembering the difference can be hard, and focusing on getting the words right may obscure the good mathematical thinking a student is doing. Rather, keep using the terms yourself so that students continually hear them used correctly in context.

Other terms that may come up in this context and may need some explanation are *horizontal*, *vertical*, and *diagonal*.